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Remarks:
Claim 19 is deemed to be abandoned due to non-payment of the claims fee (Rule 31 (2) EPC).

(54) A pressure relieving mattress

(57) This invention relates to mattresses, such as pressure mattresses comprising a base portion 11a and an upper portion 11b overlying the base portion and having an interface 11c between the portions which has a coefficient of friction low enough such that the portions can slide relative to each other. This enables relative movement of the portions, when the mattress is lying on a profiling bed and the bed is being profiled.

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Description

[0001] This invention relates to a mattress such as a pressure relieving mattress.

[0002] It is well known to provide pressure relieving mattresses for hospital beds to reduce the number and severity of pressure sores experienced by immobile patents. Typically such mattresses fall into two classes. Those which comprise foam-based products, which incorporate a profiling on the upper face, and those which are inflatable and work by progressive inflation of successive cells.

[0003] Over the years profiling beds, where the head, trunk, and leg portions can be articulated relative to one another, have become more and more popular but mattress design has not satisfactorily coped with these beds.

[0004] It is well known that shear and friction are significant contributory factors towards the development of pressure ulcers and, as can be seen in Figure 1, when a user is present and the bed is profiled, the user is subjected to excessive compression, shear and friction forces as schematically indicated at A-E. The body of the user is effectively pushed along the mattress each time the bed is profiled. In some instances, this movement can be as much as seven or eight inches.

[0005] From one aspect the invention consists in a mattress comprising a base portion and an upper portion overlying the base portion characterised in that the interface between the portions is a coefficient of friction low enough such that the pressure relieving portion can slide relative to the base portion.

[0006] Preferably the interface is formed by a material layer having a lower coefficient of friction with the base portion and/or the pressure relieving portion than the two portions would otherwise have with each other.

[0007] The layer may be separate from the portions or it may be attached to the one or the other of the portions. In this latter case the layer may be sprayed or otherwise deposited on one or other of the portions or adhered thereto. Alternatively the layer may be integral with one or other portion.

[0008] Most conveniently the two portions are constituted by foam layers, with the upper pressure relieving portion typically being profiled. In that case, the integral layer may be formed during the manufacture of the foam layer, for example by forming a smooth surface layer at the interface. Such a smooth surface layer may be in any case desirable if later deposition is to take place. For instance, a polytetraflouroethylene layer could be sprayed onto such a surface.

[0009] If a separate layer is used, it will preferably be thin and flexible, such as a polyurethane layer with a suitable coating, so that it does not affect the normal pressure relieving characteristics of the mattress.

[0010] From another aspect the invention consists in a mattress comprising a base portion and an upper portion overlying the base portion characterised in that the interface between the portions is formed by a material layer having a lower coefficient of friction with the base portion and/or the upper portion than the two portions would otherwise have with each other.

[0011] Such a mattress could have the other characteristics set out above. In any of these cases the upper portion may be a pressure relieving portion and the mattress a pressure relieving mattress.

[0012] In any of these cases the mattress may have a cover. Preferably the cover is formed to allow the relative movement between the portions, at least in a longitudinal direction. Indeed it is preferred that the cover principally allows relative longitudinal movement. In any event the cover may be elastically deformable to allow the relative movement and it is particularly preferred the cover is sufficiently resilient to restore the portions to their overlying positions once the force that caused the relative movement is removed and/or the mattress returns to a flat condition. The cover may be any suitable material, such as a polyurethane material. It is preferably breathable and water resistant.

[0013] In either of the above aspects the interface may be formed by an intermediate body connected to each portion to allow relative longitudinal movement between the portions.

[0014] It is particularly preferred that the body is in the form of at least one partially inflated air sac. The inflation of the air sac is intended to be sufficient to achieve separation of the facing surfaces of the portions to reduce the coefficient of friction between them, without being sufficient to affect the pressure relieving characteristics of the mattress to any clinical extent, e.g. the air sac may not be more rigid than the base portion. Alternatively the body may provide a hinge or pivot point to allow the relative movement, in which case by providing at least partial support for the pressure relieving portion, the coefficient of friction will effectively be reduced.

[0015] From another aspect the invention consists in a pressure relieving mattress comprising a base portion and a pressure relieving portion characterised in that the interface between the portions is formed to allow relative longitudinal movement between the portions in response to changes in the profile of an underlying bed.

[0016] In any of the above arrangements or those described the portions may have inter-engaging formations to prevent or limit relative lateral movement between them. In a preferred embodiment the formations are part of a dovetailed joint.

[0017] Although the invention has been defined above it is to be understood it includes any combination of the features set out above or in the following description.

[0018] The invention may be performed in various ways and specific embodiments will now be described by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a schematic side view of a profiling bed

in an articulated position and bearing a standard mattress;

Figure 2 is a schematic side view of a mattress incorporating a reduced friction layer;

Figure 3 illustrates the relative movement that can take place between the layers when a bed is profiled as in Figure 1;

Figure 4 is a cross-section through a mattress of the type illustrated in Figures 1 to 3; and

Figure 5 is a side view of an alternative form of mattress.

[0019] In Figure 1, a bed, generally indicated at 10, is articulated to place a user in a particular position. As has already been mentioned the effect on the user is to produce shear and friction forces and compression forces as are indicated by the arrows A-E. The compression force at E, is for example, created by the effective upward deflection of the mattress 11 because it does not follow the profiling of the bed 10.

[0020] The applicant is proposing that the mattress 11 should be formed of a base portion 11a and an upper profiling portion 11b with an interface 11c between them, which interface 11c is designed to allow relative movement between the portions 11a and 11b when the bed 10 is profiled. Thus, as can be seen in Figure 3, the upper portion 11b slides longitudinally on the base portion 11b because of the reduced friction interface between them. The upper portion 11b accordingly moves with patient removing friction and shear forces and the mattress as a whole properly follows the profile of the bed reducing any additional compressive forces such as E. It will be noted in Figure 3 that the upper portion 11b projects beyond each end of the lower portion 11a. This is because the lower portion effectively becomes shortened as it takes up the shorter path formed by the bend in the bed profile. This shortening is also facilitated by the relative movement.

[0021] The reduced friction layer can be formed in many ways, as discussed above. Thus it could be a sheet of suitably treated polyurethane material stuck to the facing surface of either the base portion 11a or the pressure relieving portion 11b or it could be sprayed or otherwise deposited onto that surface. As indicated the surface may also be formed during the manufacture of the foam, so that it is particularly suitable for receiving such a spray or deposition. polytetraflouroethylene based surface would, for example, be suitable. It is, however, desirable that the thickness and nature of the layer is such that it does not interfere with the normal pressure relieving characteristics of the mattress.

[0022] As it indicated in Figures 2 and 3 the mattress may usually be provided with a cover 13. This is preferably sufficiently elastic to deform locally to allow the relative movement and in this case the resilience within the material of the cover should return the portions to their overlying positions as shown in Figure 2, when the mattress once more becomes flat. However, it could be that the cover is simply somewhat oversized to allow for the necessary movement and the return to the original position may be under the influence of the re-profiling of the bed. Alternatively some other return provision, such as elastic straps could be provided.

[0023] In Figure 4 it will be seen that at the interface 11c the base portion 11a and pressure relieving portion 11b are formed with respective parts of a dovetailed joint so that lateral movement of the portions is prevented.

[0024] Figure 5 illustrates an alternative embodiment where the interface 11c is formed by a partially inflated air sac 13 which extends along the length of the mattress 11 to hold the opposed faces of the portions 11a, 11b sufficiently apart to reduce friction. The inflation is such that the sac 13 is not more rigid than the base portion 11a. It will be understood that a plurality of sacs could replace the single sac 13.

Claims

1. A mattress comprising a base portion and an upper portion overlying the base portion **characterised in that** the interface between the portions has a coefficient of friction lower enough such that the portions can slide relative to each other.

2. A mattress as claimed in claim 1 wherein the interface is formed by a material layer having a lower coefficient of friction with the base portion and/or the upper portion than the two portions would otherwise have with each other.

3. A mattress as claimed in claim 2 wherein the layer is separate from the portion.

4. A mattress as claimed in claim 2 wherein the layer is attached to the one or the other of the portions.

5. A mattress as claimed in claim 4 wherein the layer is sprayed or otherwise deposited on the one or the other of the portions.

6. A mattress as claimed in claim 4 wherein the layer is integral with the one or the other portion.

7. A mattress comprising of a base portion and an upper portion overlying the base portion **characterised in that** the interface formed between the portions is constituted by a material layer having a lower coefficient of friction with the base and/or the upper portion than the two portions would otherwise have with each other.

8. A mattress as claimed in any one of the preceding claims wherein the upper portion is a pressure relieving portion.

9. A mattress as claimed in any one of the previous claims further including a cover formed to allow relative movement between the portions.

10. A mattress as claimed in claim 8 wherein the cover principally allows relative longitudinal movement.

11. A mattress as claimed in claim 8 or 9 wherein the cover is elastically deformable to allow the relative movement.

12. A mattress as claimed in claim 9 to 10 wherein the cover is sufficiently resilient to restore the portions to their overlying positions once the force that cause relative movement is removed.

13. A mattress as claimed in claim 1 wherein the interface is formed by an intermediate body connected to each portion to allow relative longitudinal movement between the portions.

14. A mattress as claimed in claim 13 wherein the body is in the form of at least one partially inflated air sac.

15. A mattress as claimed in claim 13 wherein the body provides a hinge or pivot point to allow the relative movement.

16. A pressure relieving mattress comprising a base portion and a pressure relieving portion **characterised in that** the interface between the portions is formed to allow relative longitudinal movement between the portions in response to changes in the profile of an underlying bed.

17. A mattress as claimed in any one of claims 1 to 16 wherein the portions have inter-engaging formations to prevent or limit relative lateral movement between the portions.

18. A mattress as claimed in claim 16 wherein the formations are parts of a dovetail joint

19. A mattress substantially as herein before defined with reference to the accompanying drawings.

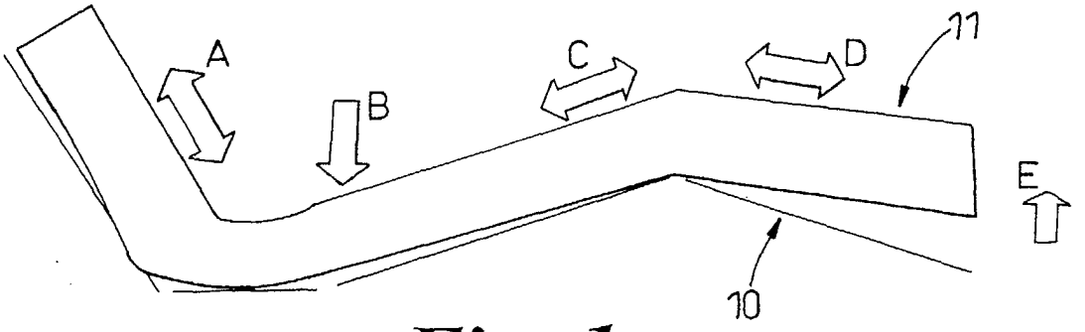

Fig. 1

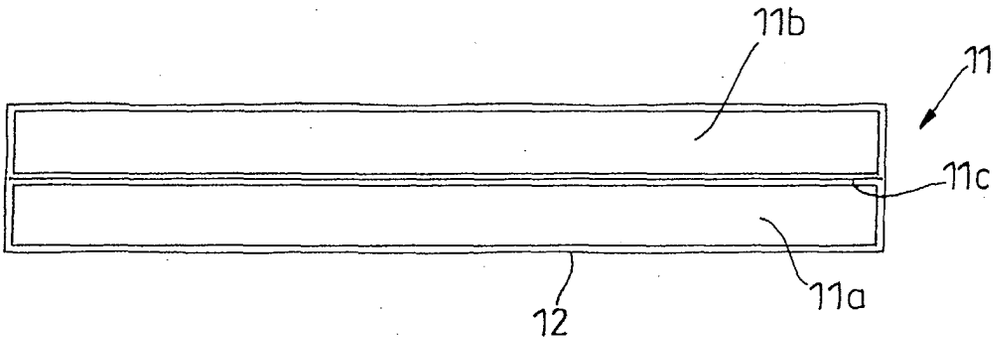

Fig. 2

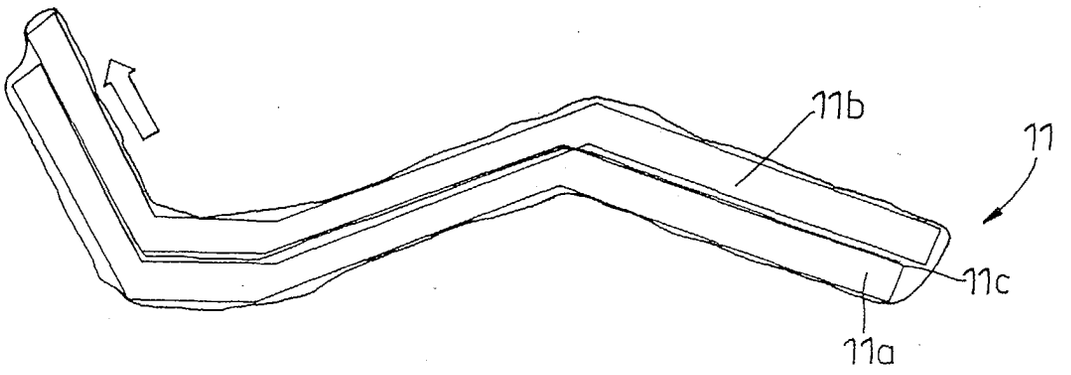

Fig. 3

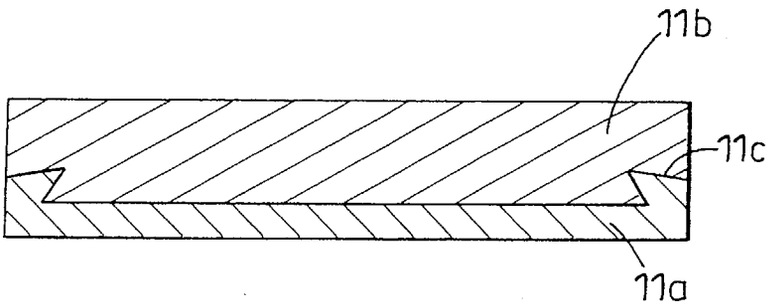

Fig. 4

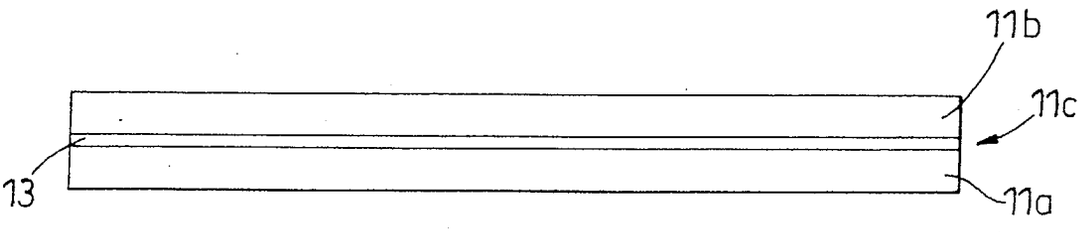

Fig. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 04 25 5099

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 April 2005	Amghar, N

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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